

CONCUSSIONS

Mild Traumatic Brain Injury

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A Special **Injury
Timeout**



Concussion (Mild Traumatic Brain Injury) occurs more frequently than many athletes realize. Even a simple “ding” which leaves a player momentarily dazed is due to mild brain injury¹. Concussions represent 3-5% of injuries in all sports, but they are under-reported and under-recognized so the actual number is probably higher². Concussions have been a subject of vigorous debate prompting several national and international meetings to create consensus statements since 2000.

This article examines recent consensus statements on concussion and will discuss the mechanism, evaluation, and management of concussions. This column is not meant to replace medical evaluation for your health problems. Always seek medical help for worrisome or persistent symptoms.

Concussions occur when the head is brought forcefully against a fixed object such as the ground or another player’s body. Inside the skull the brain moves forward at an angle, pivoting around the brainstem and slamming into the skull as shown in Figure 1³. The neurons that maintain alertness are located at the upper brainstem pivot point and injury in that area during concussion causes a decrease in alertness (“dazed”) or loss of consciousness³. Many other mechanisms of brain injury have been proposed including biochemical and metabolic changes as well as alterations in gene expression⁴. This variety of changes occurring after brain injury may help explain the variety of symptoms experienced after concussions.

When a concussion occurs, the athlete should be immediately evaluated by a trainer if available. Never move an unconscious athlete because this can make neck injuries worse. If the athlete is unconscious for more than a minute, call 911 for emergency medical attention. Fortunately, most concussions in Ultimate do not require emergency medical treatment. After a concussion with no loss of consciousness or a brief loss of consciousness, the athlete should leave the game and be evaluated on the sideline.

The 2nd International Conference on Concussion in Sport created a “SCAT (Sport Concussion Assessment Tool) Card” for evaluating

athletes with concussions. This extremely useful card summarizes all the important information about concussions for easy sideline evaluation and treatment. The card can be downloaded for free from <http://www.athletictherapy.org/docs/SCATconclusionCard.pdf>

“When a concussion occurs, the athlete should be immediately evaluated by a trainer if available.”

Someone, preferably a trainer, should evaluate the athlete for the symptoms listed in Tables 1 and 2¹. Write down their symptoms and check them again at five-minute intervals until all symptoms have disappeared¹. This information helps medical professionals determine the severity of the concussion since severity is graded by the number, type, and duration of concussion symptoms². Pay special attention to the appearance of new symptoms or symptoms getting worse. Persistent, new, or worsening symptoms require medical attention¹. Do not leave the injured athlete unsupervised until all symptoms have cleared². If the symptoms have not cleared by bedtime, the athlete may need to be woken

up at night to check for worsening of symptoms. This is especially important if they had a loss of consciousness or amnesia¹.

A brief loss of consciousness (seconds) on its own does not necessarily indicate a severe concussion⁴. However, it is recommended that any loss of consciousness be immediately evaluated by a medical professional¹. Some other indications to seek immediate medical help are listed in Table 2¹⁻². That being said, any symptoms that the athlete, parent, or coach considers worrisome or persistent do merit prompt medical attention.

Sometimes athletes have some twitches or jerks while unconscious. This is may be frightening to witnesses. Fortunately these movements are usually harmless and do not require any treatment⁴. However if a more serious convulsion occurs or if the jerking does not cease rapidly, call 911 for emergency medical treatment.

What concerns most athletes is when they can go back to playing Ultimate. There is still considerable and ongoing debate about such “return-to-play” (RTP) decisions. In 2006 the American College of Sports Medicine published a consensus statement that addresses RTP decisions². It was endorsed by twelve major American sports medicine organizations⁶. Their recommendations are summarized in Table 3. The decision to RTP should be individualized, and not based on a rigid timeline. Athletes with persistent or worsening symptoms should not RTP. Also, athletes that experienced a loss of consciousness or any amnesia, regardless of how quickly it resolved, should not RTP on the same day. A previous concussion increases the risk for a second concussion even with mild impact. It is always safest to sit the athlete out.

Returning to play the next day or afterwards should be guided by the principles summarized in Table 3². First, the athlete must have no residual symptoms at rest. The athlete should then undergo progressively more taxing exercises, then non-contact drills, then full playing. If the athlete experiences any symptoms during a task, they should stop and wait 24 hours before trying the task again. It is important to work up pro-

gressively to make sure the athlete is symptom free before RTP. The athlete should understand the increased risk of concussion after a prior concussion and sensibly avoid situations that lead to concussion.

Another method of evaluating RTP decisions is formal cognitive testing. Formal cognitive written or computerized tests can help identify subtle changes and aid in RTP decisions⁵. These tests are far more useful when taken before the concussion so that results can be compared after a concussion⁵. "Cognitive rest" while symptomatic from a concussion is recommended, particularly for athletes 18-and-under, because intense scholastic activities may prolong and exacerbate concussion symptoms⁴.

Second-impact syndrome, a very rare complication of concussions, can occur when an athlete is not fully recovered and receives a sec-

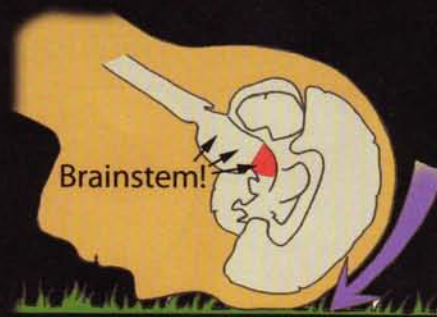


Figure 1: The brain in concussion. The area that maintains consciousness in the upper brainstem is shown in red. The brainstem is fixed-in-place by the neck bones and skull, whereas the brain is free to move forward into the front of the skull as shown by the purple arrow. The resulting twist on the pivot point of the brainstem (shown in red) causes a "daze" or full-blown loss of consciousness.

ond concussion. The second concussion causes the brain to swell catastrophically which most often leads to death¹. Almost all reported cases have been in young athletes age 18-and-under¹. From 1992-1999 there were only 17 reported cases⁶. Given this rare yet very serious risk, young athletes should be managed with stricter RTP guidelines.

Post-concussion syndrome occurs when concussion symptoms persist for weeks to months. The athlete should not RTP while still symptomatic. Further evaluation by a specialist is often warranted in this situation.

It is important to recognize and appropriately treat concussions in order to avoid prolonged symptoms and cumulative brain injury before the brain is fully healed. There is still considerable and ongoing debate about concussion and return-to-play decisions, but the bottom line is clear, "When in doubt, sit them out"⁴.

Table 1: Symptoms of concussion reported by the athlete

COGNITIVE	Loss of consciousness
	Seeing stars
	Vacant stare/glassy eyed
	Feeling "slowed down"
	Feeling "in a fog"
	Disorientation
	Memory problems
SENSORY	Easily distracted
	Sleep disturbance
	Excess sleep
	Fatigue
	Headache
	Nausea/Vomiting
	Dizziness
EMOTIONAL	Poor balance/coordination
	Ringing in the ears
	Sensitivity to noise
	Sensitivity to light
	Blurred vision
	Irritability
	Nervousness
	Sadness
	Quickly shifting emotions
	More intense emotions
Personality change	

Table 2: Reasons to seek medical attention. Additional signs not listed here may be checked by a trainer or medical professional.

Call 911 for Emergency Medical Help

- Convulsion more than a few twitches
- Loss of consciousness longer than 1 minute
- Decrease in level of consciousness
- Difficulty awakening
- Increased confusion or agitation
- Increased difficulty with balancing
- Any weakness, numbness, or tingling
- Decreased or irregular pulse
- Decreased or irregular breathing
- Unequal, large, or unchanging pupils

See a Doctor as Soon as Possible

- Any loss of consciousness
- Amnesia for more than 15 minutes
- Vomiting
- Mild symptoms that persist
- Emotional symptoms that persist
- Sleep disturbances that persist
- Cognitive difficulties that persist

Table 3: Making a decision to Return to Play (RTP)

Reasons to Absolutely Refuse Same-Day RTP

- Any persistent or worsening symptoms
- Any loss of consciousness
- Any amnesia

May Not RTP Until...

- No symptoms at rest
- No symptoms with gradually increased exertion
- Athlete understands the increased risk of concussion after an initial concussion

Delay RTP longer if...

- Athlete is age 18 or under
- Concussion is severe
- Concussion occurred with a relatively minor blow
- Second or multiple concussions

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